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August 21, 2009

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

**Re: CS Docket No. 97-80 (Commercial Availability of Navigation
Devices)**

330-833-4134

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Dear Ms. Dortch:

The following letter outlines two issues that potentially raise costs and reduce choices to consumers for cable television service, limit innovation in the set-top converter market and inhibit the full use of consumer electronics. These two topics are SimulCrypt and Clear QAM signal transmission. I respectfully request that you forward this information to the Commissioners' offices and I further respectfully request meetings with their offices to discuss these issues and the available solutions

EXECUTIVE SUMMARY

Massillon Cable TV, Inc. (Massillon) recently completed a massive spectrum recovery project. This project was made possible by a separable security waiver from the FCC. The recovered spectrum has already been used to launch many High Definition (HD) and Standard Definition (SD) TV services and pave the way for DOCSIS 3.0 data services.

Massillon varied from others who have made the transition to all-digital/no-analog systems by pioneering a new type of set-top converter. Notably, these converters were not manufactured by Motorola or Cisco/Scientific Atlanta.¹ Instead, Massillon forged relationships with new manufacturers and distributors to bring new competition, lower prices and new features to consumers. These relationships went well beyond simply purchasing "dumb" set-top converters. They include access to new conditional access providers and the promise of long-term cost reductions.

¹ Motorola and Cisco/Scientific Atlanta are widely recognized as a US duopoly in the set-top converter market. Their control of the market through proprietary conditional access systems leaves cable operators little choice in terms of set-top converter prices, features or suppliers.

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Two conclusions came to light during this project.

1. Cable providers need access to (and support for) a system known as SimulCrypt² in order to preserve the benefits of low-cost set-top converters beyond current Digital-To-Analog converters. Otherwise, a competitive market for Digital-To-Digital set-top converters will not develop. Without SimulCrypt, all digital services will eventually require the use of more expensive Digital-To-Digital set-top converters from one of these duopoly providers. Thus, our deployment of low-cost set-top converters will have only a temporary benefit of lower prices for Digital-To-Analog converters which, by design, have only a short lifespan. More importantly, other cable providers will not be able to follow our example and purchase low-cost converters as they move toward their own all-digital futures.
2. An appropriate balance between consumer desires and content protection must be found in terms of signal encryption. Consumers are adopting digital TV sets at a rapid pace in spite of the current economy. It is possible to present them with a wide range of SD and HD programming without the need for a set-top converter. This has obvious appeal to consumers. However, this wide variety of programming is threatened by requirements to encrypt all digital program services. This requirement, if widespread, will strip consumers of the ability to use their digital TV sets fully and force them to install (and pay for) a set-top converter on every TV set instead. Coupled with the current unavailability of SimulCrypt, this encryption will require consumers to use higher-cost set-top converters as well. While easy access to programming is important to consumers, it also is important to recognize the legitimate concerns that content owners have regarding the security of their programs. Standard Definition programming included as part of Basic Cable service currently is largely unencrypted and available to consumers with digital TV sets. It does not provide the same level of quality and clarity as High Definition programming. Therefore, it is less valuable. High Definition programming, on the other hand, is widely acclaimed for its quality and has become a target for content piracy. As a result, virtually all High Definition programming (other than HDTV signals of local broadcast stations) are encrypted. It is our conclusion that this

² SimulCrypt is a system that allows multiple encryption keys to function on the same digital program stream. Motorola and Cisco/Scientific Atlanta have both developed SimulCrypt and include it in their products. However, they will neither provide nor support SimulCrypt in the United States. They do provide SimulCrypt in other parts of the world where they face significant competition for both set-top converter and conditional access system sales.



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current scenario provides the appropriate balance. Consumers can watch the program networks they have come to expect without a set-top converter in roughly the same quality (Standard Definition). They must, however, install a set-top converter in order to enjoy the higher quality of HD. This also preserves the current protections enjoyed by the program owners.

Therefore we ask the Commission to consider whether it is in the best interest of consumers to:

1. Require manufacturers of conditional access systems (CAS) to include and support SimulCrypt. This would enable MVPDs to make a wider range of options available to consumers, including low-cost, one-way, small-profile set-top (or set-back) converters. This will enable digital TV owners greater flexibility to choose the type of set-top converter that best suits each individual budget and application.
2. Require program networks to allow distribution of unencrypted Standard Definition signals and allow program networks to require distribution of encrypted High Definition signals. This would enable digital TV owners to use their advanced TV sets fully without unreasonably impinging on the rights of program distributors.

SIMULCRYPT

Theory of Operation

SimulCrypt is a system that allows multiple encryption keys to function on the same digital program stream. Digital signals are scrambled (or "encrypted") in the headend with an Encryption Key. The "key" is required to reassemble the digital information into recognizable video and audio elements. The conditional access system creates a signal in the digital stream which carries the key to the converters. The SimulCrypt standard allows multiple CAS vendors to encrypt and carry this key. Set-top converters receive this key as part of the digital signal. Authorized set-tops receive the key and can, therefore, unscramble the encrypted digital signal. Unauthorized set-tops lack the key and cannot.

Different CAS use different encryption algorithms to secure their keys. Therefore, they also have different implementations in the converters. Despite these differences, the standardized method called SimulCrypt allows the same digital video signal to be encrypted once and delivered successfully using multiple CAS encryption algorithms. The multiple keys also can be transmitted in a variety of methods. In this manner, SimulCrypt allows a cable system to install multiple CAS and provide the same services to consumers even when they are equipped with different converters. The



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great benefit is the ability to use multiple CAS and different set-top converters without having to dedicate additional spectrum.

SimulCrypt Is More Than A Theory.

Motorola and Cisco/Scientific Atlanta (Cisco) incorporate SimulCrypt into their headend products that are widely sold in Europe and other continents. The availability of SimulCrypt in other world markets has led to the development of more than a dozen different CAS and dozens of competing set-top manufacturers. Only the US lacks this open standard and the benefits of competing vendors.

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Neither Motorola nor Cisco offer and/or support SimulCrypt in the United States. Refusing to offer or support SimulCrypt allows Motorola and Cisco to maintain their positions as duopoly providers of CAS in the US. Cable operators already have significant investments in Motorola and Cisco proprietary CAS and set-top converters. Activating a competing CAS would require completely abandoning the headend CAS and replacing all set-top converters. This would be expensive, time-consuming and highly intrusive to consumers. The inability of cable operators to install competing CAS keeps prices for set-top converters high and innovations low.

As might be imagined, SimulCrypt is provided and supported in regions where the US duopoly providers have been unable to secure set-top sales due to a large price difference. They are unable to sell high-priced set-top converters, but they still compete for the headend equipment sales. To do this, they must support SimulCrypt. For example, Motorola recently announced a new product; the APEX 1000. The advertising information announcing the European version prominently features the fact that SimulCrypt is available. The exact same product is advertised in the US but all mention of SimulCrypt is eliminated from the advertising material.

Massillon uses Motorola equipment so I am more familiar with it. The Operations Manuals and Application Notes are filled with references to SimulCrypt and yet Motorola refuses to provide or support it. The same equipment we use is offered in Europe and Motorola not only supports SimulCrypt, but they actively promote it. We suspect that the reason Motorola does not provide SimulCrypt in the United States is that they fear it would lead to the introduction of competing conditional access systems and new set-top converter manufacturers and distributors. Plain and simple, Motorola is protecting their US set-top converter market by refusing to support a product they manufacture. Access to SimulCrypt would enable us to provide more customer choice and new, lower-cost options to our



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customers. The refusal of Motorola and Cisco/Scientific Atlanta to provide and support this existing feature is anti-competitive and anti-consumer.

Multiple Conditional Access Systems Work

Massillon has two CAS: Motorola and Conax. Both of them are integrated into our customer billing system and work properly. We have completed proof-of-concept tests of the Conax system. It provides excellent security for the digital signals and accurate, timely control of set-top converters. However, due to the unavailability of SimulCrypt, we have not implemented it on a wide-scale basis.

In summary, SimulCrypt is vital to a competitive set-top converter market.

- With SimulCrypt, cable systems have a choice among multiple vendors for both headend processing and set-top converters. They can choose the best CAS based on varying needs and prices. Multiple set-top vendors can, and do, manufacture low-cost, innovative devices where this open standard system is available.
- Without SimulCrypt, cable systems must install a proprietary CAS and continue to purchase set-top converters from only one provider. This gives the provider no incentive to reduce the cost of the set-top converters or provide low-cost options.

Without SimulCrypt, Capacity Requirements Limit Multiple CAS

It is theoretically possible to operate multiple CAS without SimulCrypt. To do so, a cable system must duplicate a great deal of headend equipment in addition to the second CAS. Without SimulCrypt, the cable operator must also purchase, install and maintain a duplicate set of equipment to transmit all encrypted signals. This is called a simulcast; one set of signals for each CAS. This makes it technically possible, but financially unfeasible. The introduction of broad HD program offerings makes multiple CAS impossible without SimulCrypt due to bandwidth limitations of simulcasting.

If the cable system were to eliminate its analog spectrum and add no additional services, a second CAS is easily accommodated. The cable system would have adequate spectrum to simulcast the encrypted SD and HD signals and control them with a second CAS. It would require about 150MHz of spectrum for this simulcast (the total encrypted spectrum).

Of course, that is not the goal of analog spectrum reclamation. The goal is to launch new HD signals and DOCSIS 3.0 High Speed Data. So, the cable system will launch 50 or more HD signals (requiring up to 150MHz) and bond channels together for DOCSIS 3.0 (requiring another 30MHz).



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In a traditional cable system (without broad HD services), the majority of spectrum (perhaps 70%) is used for analog signals. Only a limited number of services are encrypted and controlled by the CAS. The amount of spectrum allocated to Standard Definition digital signals is fairly small and most are not encrypted. A cable operator would only need to recover a fairly small amount of analog spectrum in order to simulcast these encrypted SD digital signals using a second CAS. This changes with analog reclamation and the introduction of many HD signals because HD signals require far more spectrum than SD and they are encrypted. An example may be the easiest explanation.

Following is a spectrum allocation for a typical cable system under three scenarios.³ The two digital scenarios assume the cable system is operating multiple CAS.

1. Now (analog/digital operation) – The system includes a large number of analog channels plus typical SD and HD offerings.
2. SimulCrypt – The system has recaptured analog spectrum and has used that spectrum to launch new HD and SD networks and offer DOCSIS 3.0 High Speed Data. The system still has sufficient spectrum to add almost 100 more HD services.
3. No SimulCrypt – The system has recaptured analog spectrum and has used the spectrum to launch new HD and SD networks and offer DOCSIS 3.0 High Speed Data. While increasing HD offerings to some extent, the system is now spectrum locked and cannot add any more services.

As the chart shows, a system with SimulCrypt will be able to easily accommodate many new services. At the same time, SimulCrypt will also easily accommodate equipment from multiple set-top vendors. This creates the potential for vigorous competition among those vendors. Conversely, a system without SimulCrypt will struggle to add new services because all encrypted video signals will require twice the spectrum. The alternative is to continue with only one set-top vendor.

³ Assumptions include: The system eliminates all analog signals. 6MHz of spectrum equals one analog, 12 SD or 2 HD signals. Rounding results in slight differences. Maintaining some level of analog signals and/or changing the compression ratio of SD and HD signals will yield different results, as will the use of other technologies like switched digital video. However, the fact remains that a system using SimulCrypt will always have the capacity for significantly increased service offerings assuming the cable system wishes to deploy multiple CAS.



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Type of Signal	Type of Security	Before Analog Reclamation		After Reclamation with SimulCrypt		After Reclamation without SimulCrypt	
		Channels	MHz	Channel	MHz	Channels	MHz
Return Path		NA	50	NA	50	NA	50
Analog		80	480	0	0	0	0
SD Digital	Unencrypted	80	40	100	50	100	50
	CAS #1 Encrypted	144	72			144	72
	CAS #2 Encrypted	0	0	144	72	144	72
HD Digital	Unencrypted	5	15	10	30	10	30
	CAS #1 Encrypted	25	75			42	216
	CAS #2 Encrypted	0	0	72	216	72	216
Non-Video		NA	18	NA	48	NA	48
		254	750	329	466	304	754
		Spectrum locked		284 MHz Available		Spectrum Locked	

Small System Considerations

The US cable TV industry has operated within a duopoly market for addressable set-top converters almost since these devices first became available 30 years ago. Both of these suppliers offer only proprietary systems so there is virtually no competition between them after the initial decision is made to deploy a converter system. Thus, the market power exerted by the two major suppliers has been especially difficult for small- and medium-sized cable companies because we lack sufficient size to negotiate lower prices through bulk purchasing. Despite the ever-growing volume of the set-top converter market and the ever-shrinking costs of other consumer electronic devices, the capital cost for set-top boxes continues to climb. Historically, we have had little choice but to pay whatever price is set because, without the equipment, we will not be competitive. We are on the horns of a dilemma. We must purchase and deploy addressable set-top converters demanded by consumers, but each purchase puts us more tightly in the grasp of a sole supplier. SimulCrypt, with its ability to allow the introduction of new set-top converters without sacrificing the embedded base, offers an opportunity for vendor competition and consumer choice.

Therefore we ask the Commission to consider whether it is in the best interest of consumers to require manufacturers of conditional access systems to include and support SimulCrypt. This would enable MVPDs to make a wider range of options available to consumers, including



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low-cost, one-way, small-profile set-top (or set-back) converters. This will enable digital TV owners greater flexibility to choose the type of set-top converter that best suits each individual budget and application.

DIGITAL SIGNAL ENCRYPTION

Consumer Expectations

One of the observations from Massillon's recently-completed Digital TV Rollout is that many consumers expect to use their digital TV sets without set-top converters. There are many reasons why they have this expectation, but that is beside the point. They have that expectation and we want to provide service to meet those expectations. The only way to meet the consumer expectation of using a digital TV set without a converter requires that some digital signals are unencrypted. Otherwise, the consumer will need to use a set-top converter or install a CableCard.⁴ This observation may seem self-evident, but there is a very real threat to this expectation. Some program networks have attempted to force encryption of all digital programs.

It is important to recognize the difference among analog, Standard Definition (SD) and High Definition (HD) signals.

- Analog signals are the most widespread. They are almost universally unencrypted. Any security required to limit access is done with physical traps installed (or removed) outside the home.
- SD signals are very similar to analog signals. They are distributed widely and are largely unencrypted. Most cable companies ensure security of unencrypted SD signals with physical traps.
- HD signals are different from both analog and SD signals. Other than the HD signals of broadcast TV stations, HD signals are almost universally encrypted. Therefore, an advanced set-top converter or CableCard is required to view them. A CAS provides this security.

A major difference between SD and HD signals is the need to protect them from unauthorized reproduction. The quality of SD signals is similar to analog. These signals are not highly desirable for illegal reproduction. HD signals, on the other hand, are highly desired for illegal reproduction. Thus, it is important to recognize the legitimate concern of program content owners to protect these valuable assets.

⁴ Virtually no digital TV sets are being manufactured with a CableCard option.



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The ability to record digital signals is another concern among consumers. As with analog signals, consumers expect to be able to record digital programs for home use. This is not a major issue as the consumer electronics industry has incorporated CableCard technology into the current generations of digital video recorders (DVR). This allows legal recording of both SD and HD programs. Similarly, DVRs provided by MVPDs allow legal recording for home use while protecting the content owners.

The Threat to Unencrypted SD Programs

Some program providers have attempted to force encryption of all digital programs, both SD and HD. To date, we have successfully resisted demands to encrypt SD programs. This allows us to meet the expectations of digital TV owners to watch television without a converter. We have complied with requests from content owners to encrypt HD programming.⁵ This arrangement (unencrypted SD and encrypted HD) seems to meet consumer expectations. When they purchase a new digital TV set to replace an analog TV, they see the same programming in roughly the same quality without a converter – basically status quo.

Our experience is that most consumers expect to install some type of advanced set-top on their “main TV.” This will take the form of a Tivo, Moxi, Tru2Way TV or advanced set-top. Many customers want a DVR, Video-On-Demand and interactive applications. However, there are a great many people and a great many locations where an advanced, high-cost, large-profile, set-top simply doesn't make sense. Yet, that is what consumers may face as their analog TV sets fail if content owners successfully press their demands to encrypt both SD and HD content.

Therefore we ask the Commission to consider whether it is in the best interest of consumers to require program networks to allow distribution of unencrypted standard definition signals and allow program networks to require distribution of encrypted High Definition signals. This would enable digital TV owners to use their advanced TV sets fully without unreasonably impinging on the rights of program distributors.

⁵ Not all HD content is encrypted. HD signals from broadcast TV stations are not encrypted. Some non-broadcast services, like QVC and HSN, request that their content remain unencrypted in order to reach the widest possible audience.



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SUMMARY

Consumer Expectations Threatened

As part of Massillon's recently-completed project to eliminate all analog signals from our systems, we provided Digital-To-Analog set tops as a bridge so analog sets would continue to work in our new, all-digital world. These small set-tops enable consumers to keep using their 13" analog TV set in the kitchen or guest room without added expense. However, what is likely to happen when the legacy analog TV set fails? The customer is likely to visit a consumer electronics store and purchase a small digital TV set for less than \$200 to replace it. At a minimum, the customer will expect to continue to receive all of their current channels. Most likely, they also expect to see the HD versions of some networks. Imagine their surprise and frustration if they find their new, advanced, digital TV set is restricted to Lifeline service (about 20 unencrypted SD and 7 or 8 off-air HD signals) unless they pay a monthly fee and give up a couple square feet of counter space for an advanced set-top converter. With the current environment, this consumer will probably pay more than \$100 a year to receive HD programming on their \$200 TV set.

Under current conditions, this scenario is very likely because:

- Continued pressure from program suppliers may cause virtually all SD and HD programs to be encrypted, and.
- Absent SimulCrypt, we have only one supplier of set-top converters that can deliver SD and HD signals. These are expensive, advanced, two-way set-top converters.

It's a perfect storm that leads to fewer consumer options and higher monthly costs. The Commission should consider whether this scenario is in the best interest of the public.

CAS Alternatives Exist

Massillon believes there is an alternative which we call a Digital-To-HDMI converter. It is similar to the Digital-To-Analog converters we now use, but has a digital output in addition to an analog output. This would give consumers a low-cost option for linear SD and HD networks. It fills the void that currently exists between no set-top (and very limited service) and an advanced, two-way set-top (with access to unwanted services and a relatively high monthly cost).

There is an obstacle, however, to this application. As described above, it lies in the duopoly CAS market that currently exists in the US. At the present time Motorola and Cisco/Scientific Atlanta are the only major manufacturers of set-top boxes and, importantly, the CAS for those set-top boxes. Neither Motorola nor Cisco/Scientific Atlanta manufactures a low-cost, one-way



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Digital-To-HDMI set-top. Instead, they only offer full-featured, high-cost, two-way set-tops. There simply is no choice. This doesn't have to be true.

Consumer Choice Is Possible

The adoption of policies that implement SimulCrypt and ensure access to unencrypted SD programming would lead to a continuum of consumer choice. It is important to note that these are not exclusive options. They can be co-mingled in the same home.

- No set-top – a consumer could choose to use a digital TV set without a set-top converter. They would be able to view SD and HD programs; roughly the equivalent of Basic Cable service. This is what they receive now with their analog TV set. This would be the choice for TV sets in tight spaces, that are used infrequently or simply to save money.
- Digital-To-HDMI set-top (or set-back) – a consumer could choose to use a low-cost, one-way, small-profile converter to receive linear SD and HD program services. Their program choices would expand to include a wider selection of HD content and optional services. This would be the choice for consumers who want more programming but have no interest in high-tech, interactive features.
- Advanced Set-Top – a consumer could choose to use a fully-featured, two-way set-top with DVR, video-on-demand, pay-per-view and other services.

This continuum of consumer choice is only possible if both conditions (unencrypted SD programming and SimulCrypt) exist.

Respectfully Submitted,

Robert Gessner

President, Massillon Cable TV, Inc.

Cc: Brendan Murray (Media Bureau)
Steven Broeckaert (Media Bureau)
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